

Claims

1. Nonwoven layer for a filter, in particular, for a vacuum cleaner bag, characterized in that at least one region of the nonwoven layer, the region having a predetermined thickness and a predetermined area, has an average pore size smaller than 50 µm and comprises fibers being bonded together such that a movement of the fibers relative to each other in a direction parallel to the surface of the layer is inhibited.
2. Nonwoven layer according to claim 1, wherein the nonwoven layer is an air-laid and/or carded nonwoven layer, a spunbond or spunlace nonwoven layer, or a meltblown nonwoven layer.
3. Nonwoven layer according to claim 2, having a basis weight between 10 and 100 g/m² and wherein the spunbond fibers have an average fineness of 0.6 – 12 denier, the meltblown fibers have an average diameter of 1µm – 15µm, and the carded fibers have an average fineness of 1 – 16.7 denier.
4. Nonwoven layer according to one of the preceding claims, wherein the at least one region comprises an adhesive.
5. Nonwoven layer according to claim 4, wherein the adhesive is a hotmelt, a cold glue, a dry-bond adhesive, and/or a thermoplastic polymer, preferably a pulverized polymer.
6. Nonwoven layer according to claim 5, wherein the amount of hotmelt is between 1 and 10 g/m².
7. Nonwoven according to one of the claims 1 – 3, wherein the at least one region is a hot calendered region.
8. Composite layer for a filter, in particular, for a vacuum cleaner bag, comprising:
 - a first nonwoven layer according to one of the claims 1 – 6, and
 - a second nonwoven layer on top of the first nonwoven layer,

wherein an adhesive is located at an interface between the first and second nonwoven layer such that fibers of the first and/or the second nonwoven layer are bonded together and a movement of the fibers in the first and/or second nonwoven layer relative to each other in a direction parallel to the surface of the layer is inhibited.

9. Composite layer according to claim 8, wherein the first or second nonwoven layer is a spunbond nonwoven layer, the other nonwoven layer is a meltblown nonwoven layer, and the adhesive is a hotmelt.
10. Method for producing a nonwoven layer according to one of the claims 1 – 7, comprising the step of:

treating at least one region of the nonwoven layer, the region having a predetermined thickness and a predetermined area, such that the nonwoven layer has an average pore size smaller than 50 µm and such that the fibers are bonded together and a movement of the fibers relative to each other in a direction parallel to the surface of the layer is inhibited.

11. Method according to claim 10, wherein the treating step comprises the steps of:

spraying of hotmelt, cold glue, dry-bond adhesive, and/or thermoplastic polymer, preferably pulverized polymer, and,

applying pressure to obtain a bonding of the fibers.

12. Method according to claim 10, wherein the treating step comprises the step of hot calendering.

13. Method for producing a composite layer according to claim 8 or 9, comprising the steps of:

providing a first nonwoven layer,

applying an adhesive to the first nonwoven layer, and

providing a second nonwoven layer,

wherein the adhesive is located at an interface between the first and second nonwoven layer such that fibers of the first and/or the second nonwoven layer are bonded together and a movement of the fibers in the first and/or second nonwoven layer relative to each other in a direction parallel to the surface of the layer is inhibited.

14. Method according to claim 13, further comprising the step of applying pressure to obtain a bonding of the fibers.
15. Filter medium, in particular, for a vacuum cleaner bag, comprising a filter structure **characterized in that** a surface or an interface of the filter structure is provided with a filter paper layer having a smaller surface area than the filter structure.
16. Filter medium according to claim 15, wherein the filter paper layer is bonded to the filter structure.
17. Filter medium according to claim 16, wherein the filter paper layer is bonded using an adhesive such as a hotmelt, a cold glue, a dry-bond adhesive, and/or a thermoplastic polymer.
18. Filter medium according to claim 16 or 17, wherein the filter paper layer is bonded to the filter structure at discrete regions.
19. Filter medium according to one of the claims 15 – 18, wherein the filter structure comprises a nonwoven layer.
20. Filter medium according to one of the claims 15 – 19, wherein the filter structure comprises successively a spunbond, an air-laid, a spunbond, a meltblown, and a spunbond layer.
21. Filter medium according to one of the claims 15 – 20, wherein the filter paper layer has an air permeability of at least about 250 l/m²/s, preferably of at least about 500 l/m²/s, most preferred of at least about 600 l/m²/s.
22. Vacuum cleaner bag comprising a filter medium according to one claims 15 – 21.

23. Vacuum cleaner bag according to claim 22, wherein the filter paper layer is provided at a region of a surface of the filter structure such that, in operation, the region is exposed directly to an airflow entering the bag.
24. Vacuum cleaner bag according to claim 22 or 23, comprising two portions of filter medium wherein both portions are bonded together at an outer edge and wherein the first portion comprises an air inlet and the second portion comprises the filter paper layer at a region opposite to the air inlet.
25. Vacuum cleaner bag according to claim 24, wherein the filter paper layer is provided at the inner surface or the outer surface of the bag.